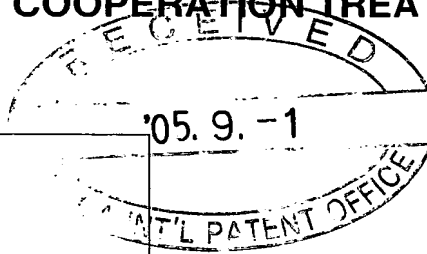


PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY



PCT

To:

see form PCT/ISA/220

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY (PCT Rule 43bis.1)

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No.
PCT/JP2005/006719

International filing date (day/month/year)
30.03.2005

Priority date (day/month/year)
31.03.2004

International Patent Classification (IPC) or both national classification and IPC
B01J20/10, C01B33/14

Applicant
SHOWA DENKO K.K.

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☒ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☒ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☒ Box No. VII Certain defects in the international application
- ☒ Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA:



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**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/JP2005/006719

Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
 - ☐ This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
 - ☐ a sequence listing
 - ☐ table(s) related to the sequence listing
 - b. format of material:
 - ☐ in written format
 - ☐ in computer readable form
 - c. time of filing/furnishing:
 - ☐ contained in the international application as filed.
 - ☐ filed together with the international application in computer readable form.
 - ☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/JP2005/006719

Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non obvious), or to be industrially applicable have not been examined in respect of:

- ☐ the entire international application,
- ☒ claims Nos. 6-8

because:

- ☐ the said international application, or the said claims Nos. relate to the following subject matter which does not require an international preliminary examination (*specify*):
- ☐ the description, claims or drawings (*indicate particular elements below*) or said claims Nos. are so unclear that no meaningful opinion could be formed (*specify*):
- ☐ the claims, or said claims Nos. are so inadequately supported by the description that no meaningful opinion could be formed.
- ☒ no international search report has been established for the whole application or for said claims Nos. 6-8
- ☐ the nucleotide and/or amino acid sequence listing does not comply with the standard provided for in Annex C of the Administrative Instructions in that:
 - the written form ☐ has not been furnished
 - ☐ does not comply with the standard
 - the computer readable form ☐ has not been furnished
 - ☐ does not comply with the standard
- ☐ the tables related to the nucleotide and/or amino acid sequence listing, if in computer readable form only, do not comply with the technical requirements provided for in Annex C-*bis* of the Administrative Instructions.
- ☐ See separate sheet for further details

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/JP2005/006719

Box No. IV Lack of unity of invention

1. ☒ In response to the invitation (Form PCT/ISA/206) to pay additional fees, the applicant has:
- ☐ paid additional fees.
 - ☐ paid additional fees under protest.
 - ☒ not paid additional fees.
2. ☐ This Authority found that the requirement of unity of invention is not complied with and chose not to invite the applicant to pay additional fees.
3. This Authority considers that the requirement of unity of invention in accordance with Rule 13.1, 13.2 and 13.3 is
- ☐ complied with
 - ☒ not complied with for the following reasons:
see separate sheet
4. Consequently, this report has been established in respect of the following parts of the international application:
- ☐ all parts.
 - ☒ the parts relating to claims Nos. 1-5, 9-14

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	3, 5
	No: Claims	1, 2, 4, 10-14
Inventive step (IS)	Yes: Claims	
	No: Claims	1-5, 10-14
Industrial applicability (IA)	Yes: Claims	1-5, 10-14
	No: Claims	

2. Citations and explanations

see separate sheet

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/JP2005/006719

Box No. VII Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

see separate sheet

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING
AUTHORITY (SEPARATE SHEET)**

International application No.

PCT/JP2005/006719

Re Item IV**Lack of unity of invention**

Since the subject-matter of independent claim 1 is not novel (see point V below), there is (obviously) no technical relationship between claims 1 and 6 (see the 'Invitation to pay additional fees' of the International Search Report), involving one or more of the same or corresponding technical feature and, hence, said inventions are not so linked as to form a single inventive concept under Rule 13.1 PCT.

Re Item V**Reasoned statement with regard to novelty, inventive step or industrial applicability;
citations and explanations supporting such statement**

1. Reference is made to the following documents:

D1: WO 99/39816 A (A. YANG ET AL.) 12 August 1999 (1999-08-12);
D2: US 2003/230524 A1 (N. SOGA ET AL.) 18 December 2003 (2003-12-18);
D3: US 2004/002081 A1 (J. URTHALER ET AL.) 1 January 2004 (2004-01-01);
D4: US-A-5104632 (D.K. DOUDEN, T.J. SCANLAN) 14 April 1992 (1992-04-14).

2. The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claims 1, 2, 4 and 10-14 is not new in the sense of Article 33(2) PCT.

- 2.1 Present claim 1 calls for a column "being filled with at least an inorganic type filler comprising a double pore structure* (i.e. a bimodal pore structure), the pores having an average diameter of
(A) "not less than 0.5 micrometers to not higher than 25 micrometers" (the "through pore") and
(B) "not less than 2 nm to not higher than 50 nm" (the "meso pore"; corresponding to 0.002 micrometer and 0.05 micrometer).

- 2.2 Document D1 (for citations see the International Search Report) discloses a silica gel

having such a "bimodal pore size distribution of pores having pore diameters of about 10 nanometers and about 10 microns" (claim 20; the Table on page 8) called CSMG: "Using CSMG to preconcentrate the specie allows the accurate determination of the specie content even when only a small amount of sample is being analyzed. Moreover, the high adsorption capacity of CSMG makes it an ideal packing substrate for high efficiency liquid chromatography" (page 23, lines 16-19).

"In the present invention, the CSMG has a porosity of approximately 90% by volume and less than about 10% of the total pore volume is provided by the micropores" (page 8, lines 14-16).

It is further clear from the methods for removing components from a fluid mixture as disclosed by D1 (see for example claims 9 and 19), that the contents of D1 forms a novelty-bar for the subject-matter called for in present claims 10-14.

- 2.3 The applicant's attention is further drawn to documents D2 and D3 which disclose
- D2: "silica gel having monolithic bimodal pore structure" ... "wherein said dual microporous structure includes through pores and mesopores smaller than those of the through pores" ... "wherein said through pores have a size of 5-10 [μ m], and the mesopores have a size of 2-50 nm" (claims 1, 5 and 6); and
 - D3: "Silica gel based monolithic beds are solid rods of silica monolith that have been prepared according to a sol-gel process.

This process is based on the hydrolysis and polycondensation of alkoxysilanes in the presence of water-soluble polymers. The method leads to "rods" made of a single piece of porous silica with a defined bimodal pore structure having macro (of about 2 [μ m]) and mesopores (of about 0.013 [μ m]) when smaller rods intended for analytical purposes are prepared. The main feature of these columns is about 80% porosity" (paragraph 29).

The silica gels of both D2 and D3 are used in chromatographic processes and, hence, both D2 and D3 form, independently from D and each other, a novelty bar for present claim 1 and much of the subject-matter called for in present claims 2-5 and 10-14.

- 2.4 As far as the subject-matter of present claim 3 is concerned the applicant's attention is further drawn to the teachings of D4 (for citations see the International Search Report) and to the fact that coatings of organic compounds on column filler material is a well known feature in the art.
- 2.5 The subject-matter of dependent claims 3 and 5 is either anticipated by the teachings of the prior art or they do not appear to contain any additional features which, in combination with the features of claim 1 to which they refer, involve an inventive step, since said features come within the scope of the customary practice followed by persons skilled in the art.

Re Item VII

Certain defects in the international application

- 3 Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in the documents D1-D3 is not mentioned in the description, nor is this document identified therein.

Re Item VIII

Certain observations on the international application

- 4 The application does not meet the requirements of Article 6 PCT, because claims 10 and 11 are not clear.

Claim 10 comprises all the features of claim 11 and is therefore not appropriately formulated as a claim dependent on the latter (Article 6 PCT and Rule 6.4 PCT).